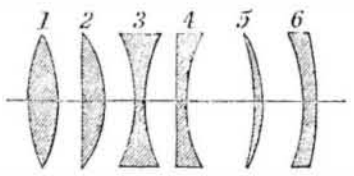
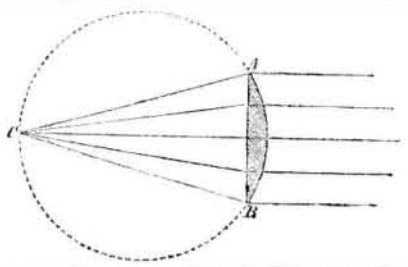
We promised to say sometbing about lenses and their uses, and we now proceed to fulfil our promise. A lens is a medium of any transparent substance so shaped that the rays of light passing through it are either collected or dispersed.

The name, lens, is taken from the Latin word for a small flat bean, which the burning glasses of the ancients, to which the term was first applied, somewhat resembles. Each beam of light has what is called its axis, and this is the middle ray, and a right line passing through the center of a lens, where the rays are not at all affected, is its axis. The point at which the rays of the sun or other light are collected by passing through a lens, is called the focus of the lens, and when rays of light fall upon a lens, they are said to do so



either directly or obliquely. No. 1 is a double convex lens, or two convex surfaces on the one glass; No. 2 is a plano-convex lens, having one side flat and the other curved outwards; those magnify by increasing the angle of vision. No. 3 is a double concave lens, having two surfaces curved inwards; No. 4 is a plano-concave, having a plane surface and one curved inward; these concave glasses diminish objects seen through them by collecting instead of dispersing the rays and diminishing the angle of vision. No. 5 is a meniscus lens, having one of its sides concave and the other side convex, gradually nearing each other, until they meet at the edge. No. 6 is a concavo-convex, having surfaces like a meniscus, only that the curves recede from each other, instead of nearing, as in the former. What the focus of



a lens is, the engraving will illustrate. Suppose A B to be a plano-convex lens, of course the distance of the focus depends upon the convexity, but it may always be calculated, because if the circle of which the curve A B forms a part were continued, it would be at C, or exactly at the opposite side of the circle on the axis of the lens. In the double convex lens, the focus is nearly in the center of the circle, because they are bent to double the angle which they would be by a simple plano-convex. Many wonders are related of the burning glass, which is a double convex lens; thus it is said that Archimedes burnt the Roman fleet, in the harbor of Syracuse, by means of glasses and mirrors, and there is little doubt that they were extensively used by the Egyptian and Hindoo priests, for lighting fires miraculously and performing "miracles" generally. The largest burning glass is now at Pekin, where it was left by an English officer; it is three feet in diameter, and is three and a half inches thick through its center, and weighs 212 pounds; ten grains of common slate were fused by it in two seconds, and ten grains of cast iron in three. Many great men have amused themselves with these philosophical toys, among whom we may mention Napier, the inventor of logarithms, and Newton, the demonstrator of gravity.

A Good Whitewash.

As this is the season of the year when people begin to clean up and make things look fresh for the approaching summer, we have frequent requests respecting the best and cheapest whitewashes, both for the outside and inside of houses. As we have in former volumes given reliable recipes of this character, we have no occasion to refer our constant readers to them; our new subscribers, however, cannot avail themselves of the same reference—the following, therefore, is for them:

Take half a bushel of fresh-burned white lime, and slack it either with hot or cold water, in a tub or barrel. When thoroughly slacked, dissolve in the water required to thin the lime, two quarts of common salt, stir it thoroughly, add one quart of sweet milk, and it is ready for use to put on with a brush.

This wash is for the outside of buildings, fences, &c., and is very durable. Some put glue in whitewash, and others flour and rice paste; but these render it liable to scale off in very dry weather.

The above wash may be made a cream color by the addition of ochre.

The above whitewash is all that can be desired for the interior of houses, excepting the salt, it must be omitted, as it tends to imbibe moisture. French white is superior to lime washes for the ceilings of rooms, as it is not so liable to turn yellowish in color, but it rubs off so easily that it cannot be used for side walls.

Curing the Backlash in Flouring Mills.

We have received a letter from a correspondent in Dundee, N. Y., in reference to the article on the above subject, which appeared in our issue of the 13th of last month (page 179). In that article it was stated that the fly-wheel of a grist mill ought to be made "sufficiently large and heavy, so that its momentum shall exceed that of all the stones combined," and if so made, backlash would be prevented. Our present correspondent states that he has built twenty steam flouring mills within the last twelve years, and in no one instance has he witnessed a steady motion produced from a single engine where the periphery of the fly-wheel did not exceed in momentum that of the stones, by one-fifth; and he is now building mills with fly-wheels, the momentum of which exceeds that of the stones in the ratio of seven to four, and he finds that this is not too much to make the motion regular. He agrees with our former correspondent that short-stroke, quick-running steam engines are the best for grinding grain; and those which he now puts up, make from 140 to 150 revolutions per minute, and they do much better than slow-running engines.

Remarkable Works of Human Labor.

Nineveh was 14 miles long, 8 wide, and 40 miles round, with a wall 100 feet high and thick enough for three chariots abreast. Babylon was 56 miles within the walls, which were 75 feet thick, and 100 high, with 100 brazen gates. The temple of Diana, at Ephesus, was 420 feet to the support of the roof. It was a hundred years in building. The largest of the pyramids is 481 feet high, and 653 on the sides; its base covers 11 acres. The stones are about 60 feet in length, and the layers are 208. It employed 330,000 men in building. The labyrinth in Egypt contains 300 chambers and 12 halls. Thebes, in Egypt, presents ruins 27 miles around, and 100 gates. Carthage was 29 miles round. Athens was 25 miles round, and contained 359,000 citizens and 400 slaves. The temple of Delphos was so rich in donations that it was plundered of $50,000,000, and Nero carried away from it 200 statues. The walls of Rome were 13 miles round.

Grinding Mills.

Thomas Blanchard, of Boston, Mass., has invented and patented a new mill for grinding grain and other substances, and he has assigned it to E. Richmond, No. 8 Water street, Boston, Mass. The claim will be found on referring to another column.

Creamer's Match Safe.

The numerous accidents which occur from the indiscriminate use of matches, and the slight nature of the boxes in which they are usually kept, has induced J. B. Creamer, of New York, to invent a metallic match safe which will deliver only one at a time, and thus in some measure act as a preventive to fires. It was patented January 12, 1858.

By referring to the accompanying engravings, of which Fig. 1 is a perspective view, showing that it is ornamental as well as useful, and Fig. 2 is a section, it will be thoroughly understood. It is made in two parts, A being one, which is a box having an inclined platform, *a*, on to which the matches drop and roll out of the safe when released one at a time from it by the cylinder, E, whose handle is seen in Fig. 1. This cylinder has

Fig. 1.

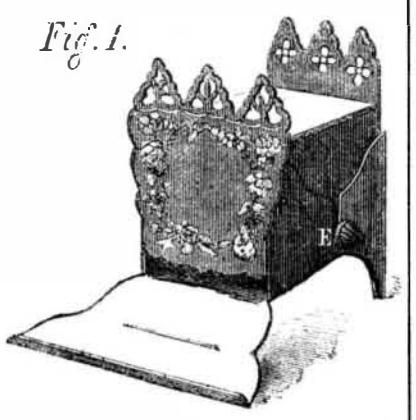
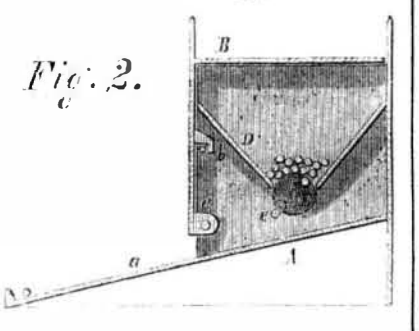


Fig. 2.



in it two grooves, *e*, each of which will contain one match, and as they are contained between the inclined plates, D, each half revolution of E carries one match from the safe to the inclined platform, *a*, from which they can be taken off. The front and top are cast together, as seen at B, and they are hinged to A at *c*; they are also provided with a catch, *b*, that holds them securely in their proper place to close the safe. When there are no matches in D a little lever (seen in Fig. 1) is depressed, and *b* is released. B is then folded back, and the safe is closed. When a match is required, the handle, E, Fig. 1, is turned half round, and one drops out. It is, as its name implies, safe, and cannot fail to be far preferable to the dangerous and clumsy boxes now in use, although the round matches only can be used in it.

Further information may be obtained from Messrs. Humphrey & Creamer, 37 Lispenard street, New York.

Friction Match Machine.

This invention relates to certain improvements in a machine for manufacturing friction matches, for which Letters Patent bearing date April 4, 1854, were granted to Wm. Gates, Jr., and H. J. Harwood. The improvement consists in the employment of cams, so arranged and formed as to perform the office of feeders, to move an endless chain or clamp used in the machine patented by the above, of wedges to open these clamps to receive the match sticks, and to allow the sticks to be discharged therefrom. Stops are also employed to retain or hold stationary the chain of clamps, while the sticks are being received by, or discharged from, them. There is also a device for guiding the match sticks into the clamps, and for holding the bolt in proper place on its bed. It is the invention of S. Miller, of Hammond, N. Y., and William Gates, Jr., of Frankfort, N. Y., and it was patented this week.

Anecdote of a Fish.

Messrs. Editors—Allow me to place on record in your valuable journal an instance of remarkable tenacity of life in a fish called the "killey," common in the brooks in our vicinity. A few mornings ago, as I was examining my aquarium, I discovered a fish that appeared afflicted with a disease that has killed a number; it presents the appearance of a white fuzz, commencing in a small spot upon the fins, tail, or back, and gradually, in the course of a few days, enveloping the whole fish, producing death. To prevent it spreading to others, (as it appears to be contagious,) I have adopted the plan of removing any upon the first indication of this disease. I took the fish from the aquarium and threw him in a stove where there was no fire, but it was partially filled with ashes, supposing that a few moments would end his misery. On coming into the room an hour and a-half afterwards, my wife remarked, "Why did you put a live fish in the stove? He is jumping about in the ashes." Sure enough, on opening the door, there was the fish alive, and so completely coated with ashes, I could not tell head from tail. I took him out, wiped the ashes off, and placed him back in the aquarium, determined, as he had shown such a tenacity for life, to let him live as long as he could. When placed in the water, he gradually and completely revived, and is now swimming as merrily as any of his companions. If this *is* a fish story, it is nevertheless strictly true.

G. F. J. Colburn.

Newark, N. J., March, 1858.